AI4CITIES

Accelerating carbon neutrality

This is part of the AI4Cities project that has received funding from the European Union's Horizon 2020 Research and Innovation Programme under grant agreement No 871914.

BEE Consortium

Eeneman Oy (Finland)
- Smart Energy Company
- Building Integrations and Controls
- Virtual Power Plant

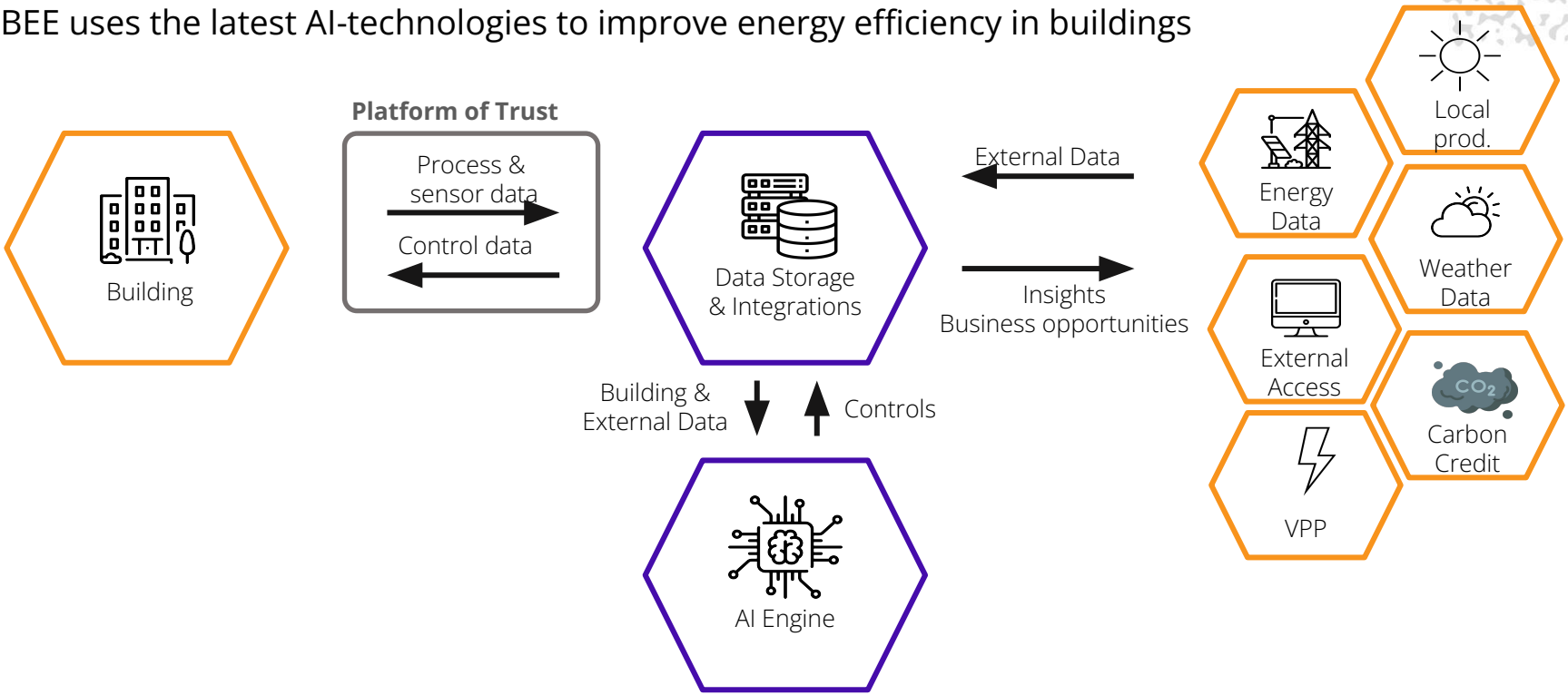
Unetiq GmbH (Germany)
- Artificial Intelligence Agency
- Building Usage Forecasts
- Control Optimization

Metropolia UAS (Finland)
- Smart Building Campus
- Data Provider and Prototyping Lab
- Emissions Calculations

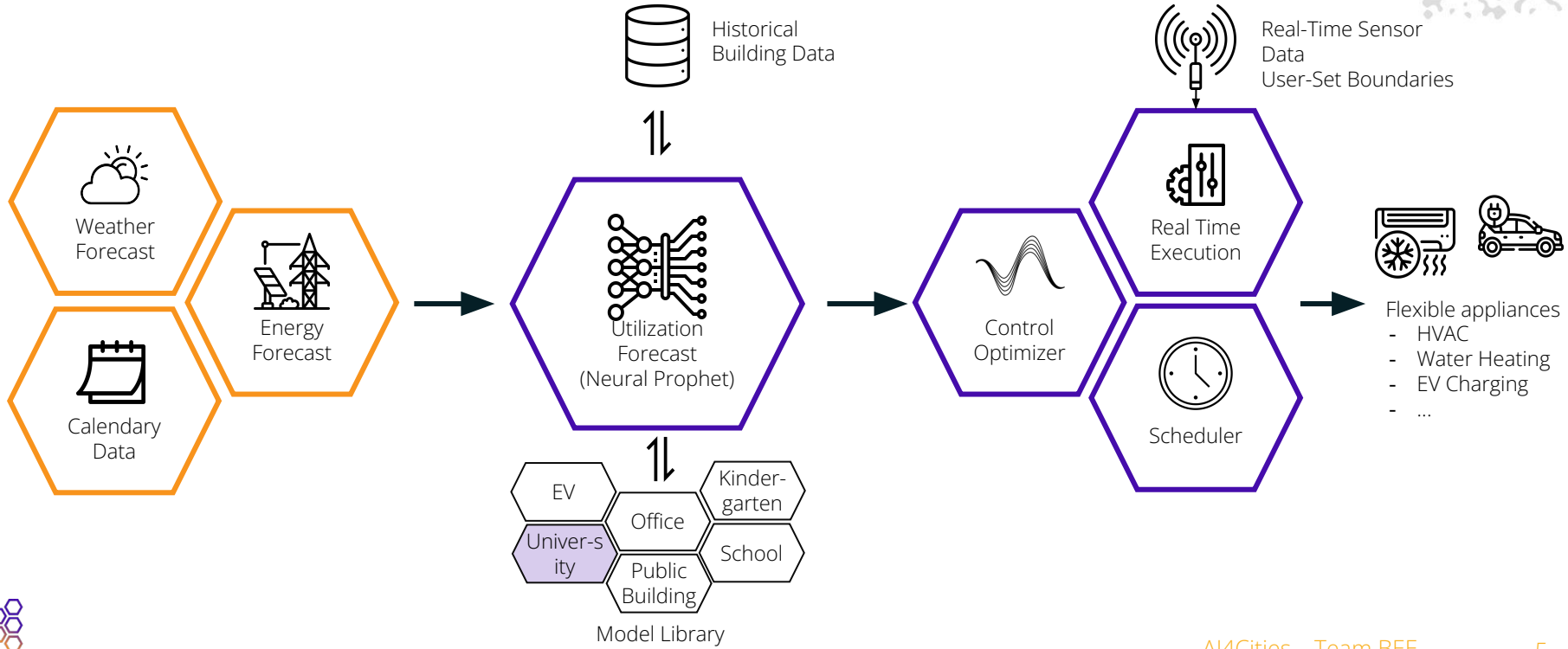
Associated Partners are not part of the AI4Cities consortium, but parts of their services can be used or offered

Purpose & Innovativeness

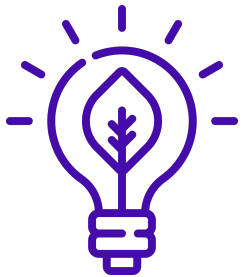
BEE uses the latest AI-technologies to improve energy efficiency in buildings



Artificial Intelligence Engine

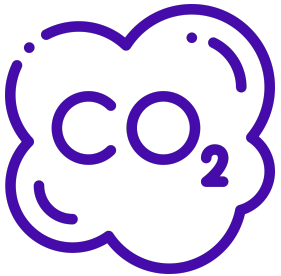


Customer Benefits



15%
Energy Consumption Reduction

16 000€
Energy Cost Savings



15%
Emissions Reduction

100%
User Comfort

Integration & Dashboards

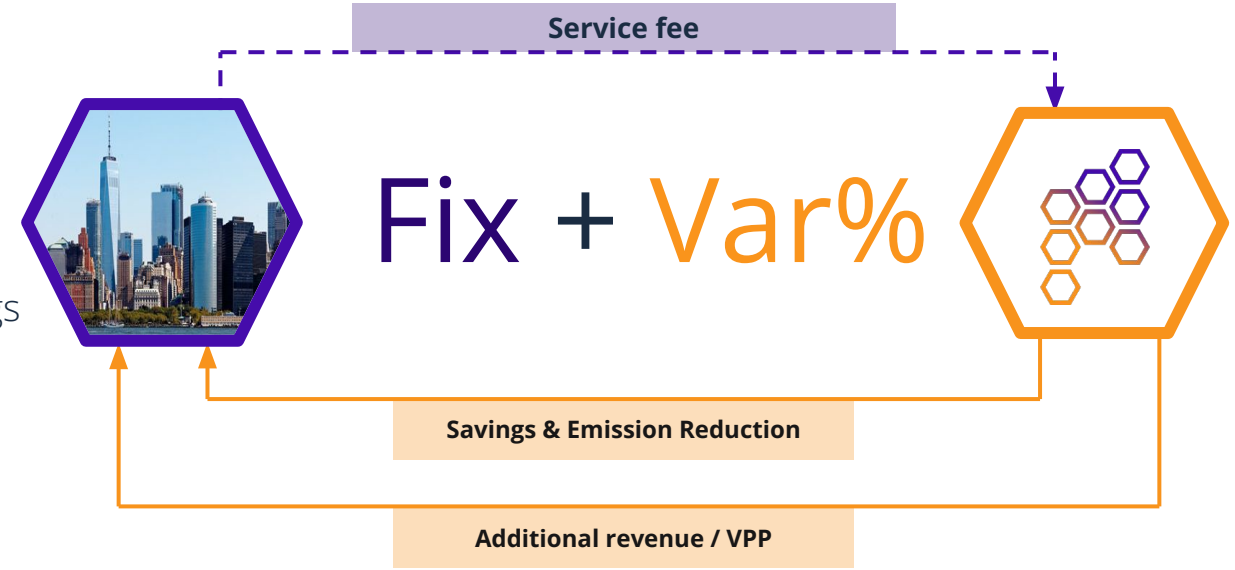
Integration of all available data-sources

Real-Time insights into the building and historical reports

Fully customizable to your needs

Business Model

Building Owners
- Office buildings
- Service buildings
- Industrial buildings



Emission Savings

Pro-Active Control
Using weather forecasts our system acts even before a weather change occurs

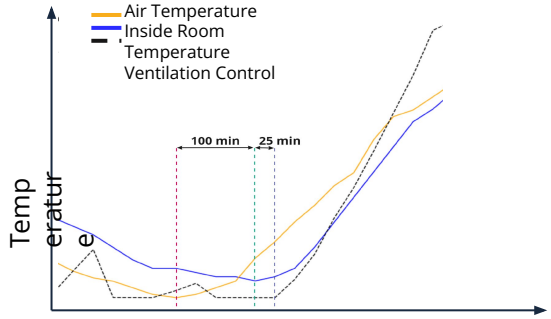
\+ **Energy Shifting**
By predicting the energy grid composition BEE shifts energy usage in times with a high availability of renewables

\+ **Peak Shaving**
BEE helps to stabilize the energy grid by providing a frequency containment reserve

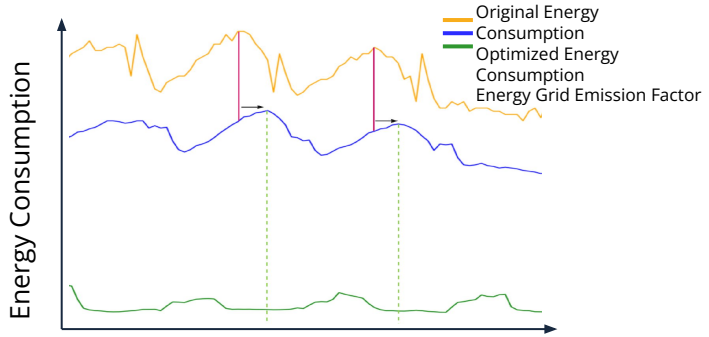
= **15 – 20% Carbon Emissions Reduction**

BEE Solution

Pro-Active Control



Energy Shifting

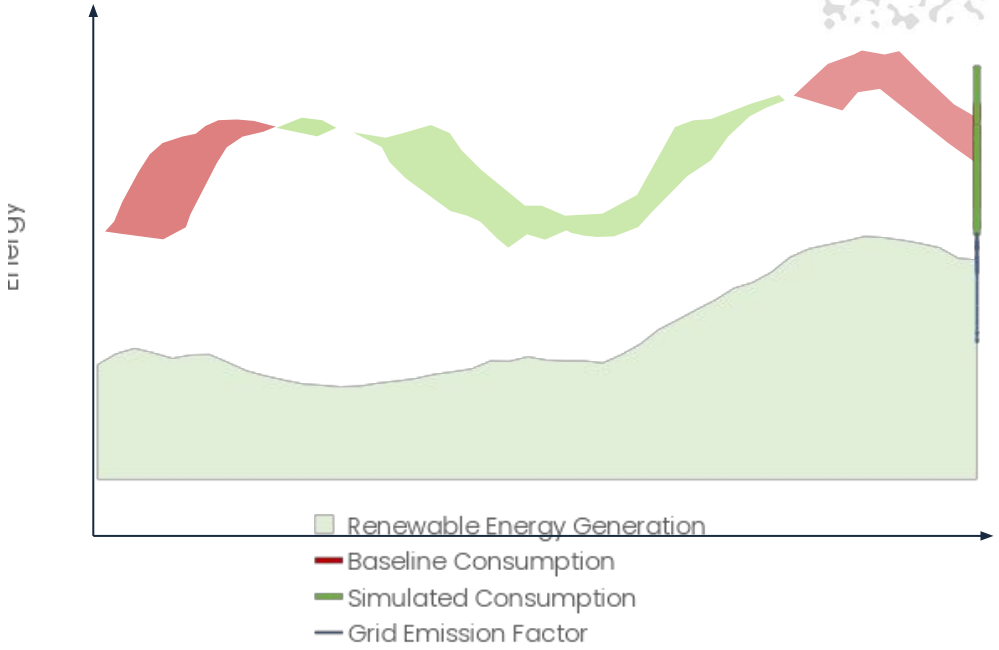


Savings Evaluation

1. Establishing a Baseline
We gather at least 2 years of historical building data

2. Simulation and Evaluation
We run a simulation of our software on the baseline data and evaluate the savings

3. Dynamic Evaluation
When the solution is deployed we compare the real consumption with similar days from the baseline



Piloting Steps

Building Integration
The interfaces into the buildings are set up and it is connected to the dashboard

Simulated Control
Control is simulated on historical and live data
Artificial Intelligence adapts to building behavior

Unoccupied Control
Testing the control during night time and weekends

Partial Control
Controlling single rooms with tight boundaries 24/7

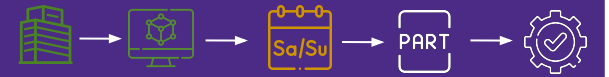
Gradual extension to full control
The control is extended room by room

Helsinki Pilot

- All interfaces created: Building, Weather, Energy, Solar
- Historical data collected and cleaned
- First simulations executed
- Preparations to control the building started
- Extension of dashboards for technical users and implementation of KPI's

Buildings

Status



Pilot Start in Building
Early July

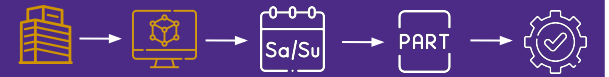
End of Phase 3 goals
CO2 Savings Evaluation
(Partial) control of two buildings

Stavanger Pilot

- Access to building data lake and weather data established
- Working on access to Plant Scada BMS, energy and solar data
- Historical Data currently gets processed and cleaned
- Extension of dashboards for technical users and implementation of KPI's

Buildings

Status



Pilot Start in Building
Mid July

End of Phase 3 goals
CO2 Savings Evaluation
(Partial) control of two buildings

Needs from the cities / Open topics

Helsinki

- Boundaries definitions
- Ventilation machine makes & models
- No show stoppers

Stavanger

- Finalizing data lake API by city
- Energy data: CO_2 coefficient for Norway

Demo


General / 1. Nuuka data 2410 Kaisanie...
Last 7 days
Electricity and heat consumption
8.60 kWh
8.40 kWh
8.20 kWh
200
150
100
50
11/25
11/27
11/29
12/01
Electricity-Consumption
Heat-Consumption
Room 318 & 408 Temperature
22
21
11/25
11/27
11/29
12/01
I202_TE_09_408_C-I202-Tila-408-huoneilman-lämpötila-asetusarvo
I202_TE_09_408_M-I202-Tila-408-huoneilman-lämpötila
I203_TE_09_318_C-I203-Tila-318-huoneilman-lämpötila-asetusarvo
I203_TE_09_318_M-I203-Tila-318-huoneilman-lämpötila
Rooms 318&408 CO2-levels
1000
800
600
400
11/25
11/27
11/29
12/01
I202_QE_09_408_M-I202-Tila-408-huoneilman-hiilidioksidi
I203_QE_09_318_M-I203-Tila-318-huoneilman-hiilidioksidi
Average electricity consump...
8.70 kWh
Room 318 Temp AVG-deviat...
-1

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